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Disability and Automation: The Promise of Cars that Automate Driving Functions

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INTRODUCTION

Cars that automate most or all driving functions have drawn a great deal of recent publicity. They are touted as bringing increased safety and convenience for drivers. They may help drowsy drivers, inebriated drivers, or drivers with poor abilities to estimate distances. They may allow drivers to multi-task,

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answering phone calls, replying to emails or even watching movies as they are cruising along. They may extend driving capability to a range of new drivers, particularly those with mobility impairments but potentially also those with many other disabilities including sensory and cognitive limitations. In sum, these cars hold the potential of exciting new possibilities for people with disabilities, the elderly, and perhaps even children to transport themselves rather than being dependent on family, friends, or the vagaries[1] of public transit. On the other hand, these cars will bring a range of new challenges, from ethical questions about how they are to be programmed, to regulatory questions about safety and liability for the inevitable accidents in which they may be involved.

Much of the publicity characterizes automated vehicles as a novel, disruptive technology. However, cars that automate driving functions can also be viewed in the context of an evolving range of mobility assistance mechanisms, from the earliest wheeled individual transport device pictured on a Greek vase, to the variety of invalid chairs invented from the sixteenth through the nineteenth centuries, to contemporary racing and motorized wheelchairs. Discussions of these vehicles often note their potential importance to people with disabilities. For example, in guidance issued in the fall of 2017, the National Highway Traffic Safety Administration ("NHTSA") observes: "automated vehicles may also provide new mobility options to millions more Americans. Today there are 49 million Americans over age sixty-five and 53 million people have some form of disability."[2] As is typical of these observations, however, the NHTSA only mentions people with disabilities as possible users of these vehicles; nowhere does it consider some of the legal horizons that might open—or close—if the benefits of these vehicles for people with disabilities are taken seriously.

This Article explores automated vehicles as a new form of mobility assistance for people with disabilities. It then considers how this classification might have different implications for the application of disability anti-discrimination law to these cars. Part of this inquiry requires consideration of the extent to which self-driving cars pose novel questions of tort liability both with regard to the right to be in the world and with regard to the possibility of

1. The use of the word "vagaries" is drawn from my favorite image of equality drawn by Richard Titmuss: whether he or a young West Indian went first for radiation treatment of their deadly cancers depended on "the vagaries of the London traffic." But my use is ironic: all too frequently people with disabilities find public transit unavailing at all. RICHARD M. TITMUSS, SOCIAL POLICY: AN INTRODUCTION 151 (Brian Abel-Smith & Kay Titmuss eds. 1974).

2. National Highway Traffic Safety Administration, *Automated Vehicles for Safety* (last visited Oct. 12, 2017), https://www.nhtsa.gov/technology-innovation/automated-vehicles [herinafter NHTSA, AUTOMATED VEHICLES]. *See generally* HENRY CLAYPOOL ET AL., *Self-Driving Cars: The Impact on People with Disabilities*, RUDERMAN FAMILY FOUND.(Jan. 2017) (which estimates that two million people might be able to enter employment once automated vehicles become a realistic possibility), http://rudermanfoundation.org/wp-content/uploads/2017/08/Self-Driving-Cars-The-Impact-on-People-with-Disabilities_FINAL.pdf.

new risks to others. Another part of the inquiry requires examination of the privacy issues these devices may raise.

But first, a word about terminology. Cars that automate most or all driving functions have been popularly characterized as "self-driving" cars. More formally, they also have been called "autonomous" vehicles.[3] These characterizations are misleading, for several reasons. First, these vehicles may be automated in different degrees and in different ways.[4] The 2017 NHTSA guidance treats these vehicles as on a continuum, from vehicles in which the human driver is assisted by advanced driver systems to a level of automation in which no human driver is involved at all.[5] For example, various functions such as braking or turning may be programmed to intercede in case of human failure, to function automatically but be subject to overrides by physical touching or by voice, or to function entirely automatically. As with currently available cars, functions such as cruise control or parking assist may be automated while other functions are not. Most moving functions might be automated—braking, steering, accelerating, changing direction—while other functions such as starting, turning off, exiting, or entering the vehicle might not be. Second, the use of terms such as "self-driving" or "autonomous" suggest degrees of control that are inaccurate and conceptually confused. Automated cars do not have selves and they are not independent of design. They do not exercise the kind of self-government that is attributed to persons with autonomy. Rather, they are designed with automated functions using programmed software. They may be designed to take advantage of available machine learning techniques, but this too is a design choice. Third, these cars likely will not function as independent entities but as part of a system of automated vehicles that reduce crash risks by how they behave as well as by how they communicate with one another.[6] They thus should be thought of as vehicles that are automated to different extents and in different ways, not as people-like cars.

3. *See generally,* S. W., *Why Autonomous and Self-Driving Cars Are Not the Same,* ECONOMIST (July 2, 2017) (explaining the difference between self-driving and autonomous).

4. *See, e.g.*, Travis J. Crayton & Benjamin Mason Meier, *Autonomous Vehicles: Developing a Public Health Research Agenda to Frame the Future of Transportation Policy*, J. TRANS. & HEALTH (Apr. 26, 2017).

5. NHTSA, AUTOMATED VEHICLES, *supra* note 2.

6. *See generally,* Mark Geistfeld, *A Roadmap for Autonomous Vehicles: State Tort Liability, Automobile Insurance, and Federal Safety Regulation,* 105 CALIF. L. REV. (Dec. 01, 2017), https://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=4381&context=californialawreview (demonstrating the importance of considering system design for automated vehicles).

I. MOBILITY ASSISTANCE: FROM WHEELCHAIRS TO SELF-DRIVING CARS

Wheeled forms of personal transit have been in existence since ancient times.[7] They have gradually been improved in ways that permit increased ease and independent use. A wheelchair pushed by others was invented for Philip II of Spain in 1595. A German watchmaker, Philip Farfler, designed a self-propelled three-wheeled chair for his own use in 1655. The cumbersome Bath chair for invalids, named after that British spa town, was in vogue during the early part of the nineteenth century. Wheel rims allowing easy self-propulsion were invented in 1881 and the first motorized chair was manufactured in London in 1916.

The return of disabled veterans from World War II spurred development of mobility devices. George Klein and a team of Canadian engineers invented an electric powered chair for veterans.[8] The Paralympic movement grew after World War II, with the first official Paralympic Games held in partnership with the Olympic Games in 1960.[9] There are now many wheelchair sports, including basketball and athletics. The first sport for power chair users, power chair soccer, has now been played for over twenty years.[10] These sports all have specific rules for mobility assistance devices aimed to promote goals such as inclusion, exciting action, fairness, and the safety of participants. Their existence has contributed greatly to the development of wheelchair and mobility assistance design.

In addition, ongoing work in neuroscience promises to open up stunning new possibilities for mobility control. Neuroscientists have been developing precise understandings of the connections between areas of the brain and mobility of specific body parts.[11] Technology companies are developing implantable chips to allow individuals who are paralyzed to exercise control over bodily movements.[12] The day may not be far off when people who are

7. Rachel Anderson, *History of the Wheelchair*, ABILITY TOOLS WKLY. (Oct. 11, 2013), https://abilitytools.org/blog/history-of-the-wheelchair/; *see also* Mary Bellis, *History of the Wheelchair*, THOUGHTCO. (last updated Apr. 13, 2017), https://www.thoughtco.com/history-of-the-wheelchair-1992670. The historical claims in this paragraph are drawn from Bellis.

8. Steve Wynler, *George Klein and the Electric Wheelchair*, WHEELCHAIR REV. http://www.wheelchair-review.co.uk/wheelchair-information/electric-wheelchairs/2/george-klein-electric-wheelchair.php (last visited Mar. 10, 2018).

9. INTERNATIONAL PARALYMPIC COMMITTEE, PARALYMPICS—HISTORY OF THE MOVEMENT, https://www.paralympic.org/the-ipc/history-of-the-movement (last visited Nov. 30, 2017).

10. WHEELCHAIR SPORTS FEDERATION, POWERCHAIR SOCCER BLOG (June 28, 2009 7:52 PM), http://www.wheelchairsportsfederation.org/adaptive-sports/powerchair-soccer.

11. *E.g.*, Carey Y. Zhang et al., *Partially Mixed Selectivity in Human Posterior Parietal Association Cortex* 95 NEURON 697, 697–708 (2017).

12. *E.g.*, Press Release, BLACKROCK MICROSYSTEMS, *Hacking the Neural Code Responsible for Movement* (Aug. 17, 2017), http://blackrockmicro.com/hacking-the-neural-code-responsible-for-movement/ (last visited Nov. 30, 2017).

quadriplegic will be able to drive their wheelchairs or move their limbs by how they think.

It is not a great step to imagine driving a car in this way, too. After all, a car is just a mobility device that provides drivers with certain advantages: shelter from the weather, a hard shell for protection in the case of contact with others on the road, and possibilities for impressive speed. So perhaps it is not so great a step to a car that automates many driving functions, too. The driver might select among preprogrammed driving options, just as drivers today choose whether they want to drive cars featuring four-wheel drive, high clearance, quick acceleration, or a tight turning radius. The driver might choose a vehicle programmed for caution (never exceed the speed limit), or risk (go up to ten miles over the speed limit), or programmed to prefer driving off the road to hitting a pedestrian in it. The driver might also opt for various override capabilities activated by voice, puffs of air, or even blinks of an eye. The design possibilities are enormous—and have implications for how people with disabilities may be able to use these vehicles and how the law might apply when they do so.

These developments open remarkable new possibilities of mobility assistance for people with disabilities and people who have difficulty driving. To take just one example, persons who have seizures typically are not permitted to drive until they can demonstrate that their seizures are under full control.[13] This restriction can make it very difficult for these persons to get to work, school, medical appointments, or other activities in the community. It might not be difficult to program a car so to select a route limited to roads with safe turnoff options; roads with these options might become more common as use of automated cars increased. The car might also be linked to sensors on the driver that could detect when a seizure is imminent and programmed to take the safe turnoff option and signal for help if needed. The availability of this option might permit people with seizure disorders to drive safely even when they have not yet been able to demonstrate full seizure control.

Much of the initial commentary treats these vehicles as raising novel legal and ethical questions that may present barriers to their adoption.[14] Some of these legal barriers are clear in current law, such as the definition of "driver" as a human person in the Vienna Convention on Road Traffic of 1968.[15] Some of the ethical issues are raised by "trolley problem" cases, in which a vehicle is hurtling

13. EPILEPSY FOUNDATION, STATE DRIVING LAWS DATABASE (2017), http://www.epilepsy.com/driving-laws/2008826.

14. For an initial effort to outline some of these issues in a primarily European context, *see* Heather Bradshaw-Martin & Catherine Easton, *Autonomous or 'Driverless' Cars and Disability: A Legal and Ethical Analysis* 20 EUROPEAN J. CURRENT LEGAL ISSUES (2014), http://webjcli.org/article/view/344/471.

15. Vienna Convention on Road Traffic. 1968. Art. 8(1).

towards a group of people who can only be saved if it is diverted towards another (typically smaller) group; here, the question is whether the vehicle should be programmed to make the swerve.[16] Another variant of this problem for automated vehicles is whether they should be programmed to prefer the safety of vehicle occupants over the safety of others using roadways or sidewalks. Responding to these potential issues, several writers have recently considered how tort and insurance law might reasonably take these vehicles into account.[17]

Despite the recognition that these vehicles might be particularly useful for people with disabilities, little of the recent commentary has specifically addressed legal issues that might be raised when drivers with disabilities seek to use automated vehicles.[18] This Article makes a start in remedying this significant omission. I begin with the prohibition on disability discrimination in employment in the Americans with Disabilities Act ("ADA"). Many workers have found that driving restrictions impede their ability to work even with accommodations; I consider whether the availability of automated vehicles may have implications for this problem. I then address issues about automated vehicles that may arise under Title II of the ADA, the public services title, including whether states that refuse to give driver's licenses to persons with certain disabilities who use automated vehicles are discriminating on the basis of disability and whether states should be expected to design streets to take the needs of automated vehicles into account. Then, I sketch some of the tort liability questions that may be raised when automated vehicles operated on behalf of people with disabilities are engaged in accidents. Finally, I consider briefly some of the privacy questions that these vehicles raise, particularly as they relate to the ADA and tort liability.

II. THE ADA AND EMPLOYMENT: AUTOMATED VEHICLES AS A REASONABLE ACCOMMODATION?

The ADA prohibits discrimination in employment on the basis of disability.[19] It is discrimination to fail to make "reasonable accommodations to the known physical or mental limitations of an otherwise qualified individual

16. Several commentators have argued this problem will be solved by liability rules rather than by ethical rules (even though the liability rules may reflect ethical judgments). *See, e.g.*, Brian Casey, *Amoral Machines, or: How Roboticists Can Learn to Stop Worrying and Love the Law*, 111 NW. U. L. REV. 231 (2017); Aarian Marshall, *Lawyers, Not Ethicists, Will Solve the Robocar 'Trolley Problem'*, WIRED (May 28, 2017), https://www.wired.com/2017/05/autonomous-vehicles-trolley-problem/.

17. For the most comprehensive discussion of this topic, *see* Geistfeld, *supra* note 6.

18. Exceptions are reports from several organizations with specific interests in disability rights. *See, e.g.*, HENRY CLAYPOOL ET AL., *supra* note 2, at 32–33 (urging disability rights advocates to organize to encourage regulators to take into account the importance of these vehicles for people with disabilities); *see also* NATIONAL COUNCIL ON DISABILITY, SELF-DRIVING CARS: MAPPING ACCESS TO A TECHNOLOGY REVOLUTION (Nov. 2, 2015), https://www.ncd.gov/sites/default/files/NCD_AutomatedVehiclesReport_508-PDF.pdf.

19. 42 U.S.C. § 12112(a) (2008).

with a disability who is an applicant or employee, unless such covered entity can demonstrate that the accommodation would impose an undue hardship on the operation of the business."[20] Reasonable accommodations are not required if the employee is not otherwise qualified; accommodations are not reasonable if they would not enable the employee to perform essential job functions[21] or if they would impose an undue hardship on the employer.[22]

Some jobs require employees to operate moving equipment such as forklifts, haulers, buses, trucks, or cars. There are many reasons why employees might have difficulty with using this equipment. Some of these difficulties could be physical: an employee who has just had foot surgery might be unable to push the gas pedal on a car or sit for a significant period of time without elevating the foot. Some are cognitive: an employee or prospective employee with limited cognitive skills may not be able to master tasks necessary to drive the vehicle or to make decisions required for its safe operation. Some could be both physical and cognitive. For example, an employee with a seizure disorder may be unable to obtain a driving license without demonstrating that the disorder has been effectively controlled for a specified period of time. An employee with monocular vision, although able to obtain an ordinary driving license, may be unable to obtain a specialized license necessary for driving certain types of heavy equipment. These employees may lose or never obtain jobs because of their limitations.

Take for example *Albertson's, Inc. v. Kirkingburg*,[23] a decision perhaps better known as part of the trilogy in which the Supreme Court severely curtailed who could count as "disabled" for purposes of the ADA.[24] Kirkingburg was hired as a truck driver by Albertson's. At the time he was hired, he was required to take a physical examination that included an eye examination to determine whether he met federal Department of Transportation ("DOT") standards for commercial truck drivers. The examining physician erroneously certified that he met the standards.[25] After Kirkingburg was injured on the job and took a leave of absence, he was required to undergo a further physical. At that examination, the physician correctly determined that, due to amblyopia, Kirkingburg did not meet the relevant DOT standards.[26] Kirkingburg applied for, and eventually received, a DOT waiver that was available to applicants with recent commercial driving experience who had not been involved in accidents or specified

20. 42 U.S.C. § 12112(b)(5)(A) (2008).

21. 42 U.S.C. § 12111(8) (defining a qualified individual as one who with or without reasonable accommodation can perform essential job functions).

22. 42 U.S.C. § 12112(b)(5).

23. 527 U.S. 555 (1999).

24. The other two cases in the so-called "Sutton trilogy" were Sutton v. United Airlines, Inc., 527 U.S. 471 (1999), and Murphy v. United Parcel Service, Inc., 527 U.S. 516 (1999).

25. 527 U.S. at 559.

26. *Id.*

violations. In the meantime, however, Albertson's fired him for failing to meet the DOT standards that, it contended, were reasonable job qualifications.[27] The Court initially addressed whether Kirkingburg was disabled for the purpose of claiming the protections of the ADA. It held that his claim to be disabled should be assessed taking into account whether he had substantial functional limitations in light of how his perceptual abilities had been affected by his amblyopia[28]—a holding that was later specifically rejected by the ADA Amendments Act of 2008.[29]

The *Kirkingburg* Court then turned to Albertson's contention that Kirkingburg was not qualified for the job, despite his having received a waiver from the DOT. The ADA permits employers to set qualification standards that are job related and consistent with business necessity.[30] Under this standard, Albertson's claimed that it was simply applying the federal DOT standards. Kirkingburg argued that the ADA required the employer to make an individualized determination of whether he met or could meet the standard with reasonable accommodations such as by obtaining the waiver. He bolstered his argument with the structure of the ADA "direct threat" defense, which permits the employer to impose as a job qualification that "an individual shall not pose a direct threat to the health or safety of other individuals in the workplace"[31] which "cannot be eliminated by reasonable accommodation."[32] Albertson's reply was that determining whether a standard is job related and consistent with business necessity does not require an individualized assessment and that it was entitled to rely on the standard set by the DOT regulations. The Court accepted this reply, together with the contention that the waiver program was not an alteration of the basic safety standards, but a demonstration project designed to acquire evidence about whether a more individualized standard should be adopted.[33] Albertson's, the Court said, and was not required to join the government's experiment or to justify on its own the government's safety regulation.[34]

There are many employees (or prospective employees) like Hallie Kirkingburg who lose employment because of their supposed inability to operate equipment.[35] The most common issues in these cases are whether the operation

27. *Id.* at 560.

28. *Id.* at 566.

29. 42 U.S.C. § 12101 n.(a)(4).

30. *Id.* § 12113(a).

31. *Id.* § 12113(b).

32. *Id.* § 12113(3).

33. 527 U.S. at 574.

34. *Id.*at 577.

35. *See* Brown v. Smith, 827 F.2d 609 (7th Cir. 2016) (question of fact whether possession of CDL is essential function of transit bus driver supervisor position); *see also* Mason v. United Parcel Service Co. Inc., 674 Fed. Appx. 943 (11th Cir. 2017) (employee with lifting restrictions not qualified as parcel truck driver); Jarvela v. Crete Carrier Corp., 776 F.2d 822 (11th Cir. 2015) (commercial truck driver with

of the vehicle is an essential function of the job, whether the employee is qualified for the position with or without accommodations, and whether the employer can raise the defenses of business necessity or direct threat.[36]

If driving is an essential function of a position, and an employee cannot legally drive, the employee is not qualified for the position. Much hinges, therefore, on the determination of whether driving is an essential job function. In many litigated cases, employees challenge their employer's determination that driving is essential to the job in question. Although courts give deference to employer's judgments about job functions, the employer's judgments are not conclusive.[37] According to the EEOC, employers must evaluate positions in terms of the objectives to be accomplished in order to determine whether driving is required for their performance.[38] The essential function inquiry is a factual inquiry, not a matter of law.[39] Courts weigh a number of factors in determining what functions are essential, beyond the employer's judgment and written job descriptions. These include the amount of time spent performing the function, the consequences of not requiring the employee to perform the function, the work experience of past incumbents in the job, and the current work experience of others in similar jobs.[40] For example, in upholding a judgment that a street supervisor for a bus company did not need to have the commercial driving license ("CDL") required for actually driving buses, the Seventh Circuit noted that the employee had never had to drive a bus in the four years he had been a supervisor.[41] Moreover, his supervisor had only had to drive a bus once in the 20 years before that he had held the position. In a similar case, the Seventh Circuit reversed a summary judgment ruling in favor of the employer when a bus mechanic's helper with vision and hearing impairments had never had to drive a bus in the twelve years he had held the position.[42] In contrast, in upholding a grant of summary judgment for the employer that driving to visit customers was an essential function of a store manager responsible for customer relations, the

diagnosis of current alcohol dependence not qualified); *see also* Coleman v. Pennsylvania State Police, 561 Fed. Appx. 138 (3rd Cir. 2014) (probationary state trooper with seizure disorder direct threat to public safety); *see also* EEOC v. United Parcel Service, Inc., 424 F.2d 1060 (9th Cir. 2005) (parcel truck driver with monocular vision a direct threat to health and safety of others).

36. The direct threat defense is 42 U.S.C. §12113(b). Controversially, the Court has extended the defense to cover not only threats to others but also threats to self. Chevron, Inc. v. Echazabal, 536 U.S. 73 (2002).

37. Hawkins v. Schwan Home Service, Inc., 778 F.3d 877 (10th Cir. 2015).

38. EEOC Office of Legal Counsel Staff Members, Informal Discussion Letter: ADA/Drivers License/Essential Functions/Reasonable Accommodation (June 21, 2006), https://www.eeoc.gov/eeoc/foia/letters/2006/ada_license_function_accommodation.html.

39. Brown v. Smith, 827 F.2d 609 (7th Cir. 2016).

40. Iselin v. Bama Companies, Inc., 690 Fed. Appx. 593 (10th Cir. 2017); Wagner v. Sherwin-Williams Co., 647 Fed. Appx. 645 (6th Cir. 2016).

41. *Brown,* 827 F.2d at 609.

42. Shell v. Smith, 789 F.3d 715 (7th Cir. 2015).

Sixth Circuit observed that the employee admitted that he spent an average of about a day's work per week in making calls.[43]

Accommodations may enable the employee who needs to be out on the road to perform the job successfully without driving herself. For some jobs, employees can reach remote sites by alternative means that may be reasonable accommodations. For example, when Whitney Stephenson, a highly successful sales representative for Pfizer who became legally blind due to an optic nerve disorder, proposed that she be able to use a driver to reach clients, the Fourth Circuit held that it was a question of fact whether driving herself or travelling was the function essential to her job.[44] Pfizer had not engaged in a discussion of whether hiring a driver was a reasonable accommodation for her, maintaining instead that driving herself was the essential job function, because there might be "significant increased risk and liability related to vehicular accidents, workers compensation, and misappropriation of and/or lost drug samples" if she used a driver rather than driving herself.[45] Employers might seek to raise similar liability concerns if employees were to suggest automated driving functions as accommodations; however, whether they would succeed in light of how vehicles might be designed to meet these concerns will be an issue.[46]

Even when employees can legally drive and thus are not legally unable to perform job functions that require driving, employers may insist on heightened safety standards as job related and a matter of business necessity.[47] While a CDL is not required to drive small delivery trucks, for example, some employers may require that employees with ordinary licenses also meet the additional physical standards for a CDL due to concerns about tort liability. United Parcel (UPS) imposed this requirement on all parcel truck drivers, for example. Deaf employees or potential employees of UPS who could not pass the "whisper test" portion of the CDL physical (which required that they be able to perceive a forced whispered voice in the better ear at not less than 5 feet, with or without a hearing aid) challenged the requirement as disability discrimination.[48] These employees could meet all the other qualifications for parcel drivers, including possession of a valid state driver's license and a safe driving record. The district court concluded, in a ruling originally affirmed by a panel of the 9th Circuit, that this requirement was not justified under the business necessity defense because UPS had not shown either that substantially all deaf employees presented a greater safety risk or that it would be too difficult to determine which ones did

43. *Wagner*, 747 Fed. App'x. at 645.

44. Stephenson v. Pfizer, Inc., 641 Fed. App'x. 214 (4th Cir. 2016) (unpublished).

45. *Id.* at 218.

46. For a discussion of tort liability, see *infra* Part IV.

47. 42 U.S.C. § 12113(a).

48. Bates v. United Parcel Serv., Inc., 465 F.3d 1069 (9th Cir. 2006).

not pose such a risk.[49] The case was reheard *en banc*, however, and the Ninth Circuit remanded it to the district court for a determination of whether the employees were qualified in the sense of safe to drive a package truck (rather than safe to drive their own cars) and whether the employer had demonstrated the defense of business necessity under the proper standard.[50] Safety features introduced through automation will be relevant to the determination in such cases of whether the employer's job qualification is justified by business necessity. There may be cases in which the employer uses automated equipment for all employees as a way to reduce risks, just as warning sounds are ubiquitous when vehicles are in reverse. The employer in such cases will not be able to rely on the expense or similar concerns with the safety devices but will need to show that the additional employee qualification is a business necessity despite the protections the device offers for disabled and non-disabled drivers alike.

Employers may also contend that the employee's operation of machinery presents a direct threat to themselves or to others. A direct threat defense must be based on an individualized assessment of the employee's condition. For example, a driver's license examiner who had panic attacks due to PTSD was found to present a direct threat to the safety of others, including members of the public applying for licenses, because of the possibility that she might have a panic attack while testing applicants.[51] Factors considered by the court in this assessment included the duration of the risk posed by her condition, the nature and severity of the potential harm, the likelihood of the harm, and the imminence of the harm.[52] In such direct threat cases, the employer will need to show that the employee using automated functions as a disability accommodation poses risks to self or others—a demonstration that may become increasingly difficult as automated designs rely on machine learning.

In sum, if drivers with disabilities have increased access to licenses because of the availability of automation, conflicts can be expected to arise over whether they are qualified for jobs that require driving or whether the employer can successfully mount a defense of business necessity or direct threat. The evidentiary questions treated by the court in the UPS case will be central to the business necessity defense: is there reason to believe that these drivers overall present elevated safety risks? Or, if not, is there particular difficulty in separating out the drivers who may present elevated risks from those who may not? These questions will be especially pressing as a matter of disability discrimination if drivers without disabilities routinely use automated devices and are permitted to

49. *Id.* at 1085.

50. Bates v. United Parcel Serv., Inc., 511 F.2d 975 (9th Cir 2007). The district court had construed the employer's business necessity defense too strongly, as requiring that the employer show a bona fide occupational qualification.

51. Felix v. Wis. Dep't of Transp., 828 F.3d 546 (7th Cir. 2016).

52. *Id.* at 569.

do so by their employers. If so, the employer will need to argue that the evidence shows that disabled drivers using automation are less safe than abled drivers using automation, or that the safer drivers using automation cannot be distinguished from the unsafe drivers. An additional problem for employers may be evidence that disabled drivers using automation are safer than non-disabled drivers who do not use automation, especially in job contexts where use of automation by non-disabled drivers is erratic. Employers who raise direct threat defenses will need to rely on individualized assessments of the safety of disabled drivers using automation. In Section IV below I will return to some of the evidence about safety and tort liability with automated vehicles and their users.

III. THE ADA AND DISCRIMINATION IN PUBLIC SERVICES: AUTOMATED VEHICLES, QUALIFICATIONS FOR DRIVER'S LICENSES, AND MODIFICATIONS IN STREET DESIGN

Under Title II of the ADA, public entities may not discriminate based on disability in the services they provide.[53] Public entities include states, local governments, and their instrumentalities.[54] Individuals with disabilities, however, must be qualified to meet the essential eligibility requirements for the service. [55] They may meet these requirements with reasonable modifications or, for communication, with auxiliary aids and services.[56] As automated vehicles become increasingly available, this non-discrimination mandate arguably may require changes in licensing and in street design, to take just two public services particularly relevant to automated vehicles.

It is well known that people with disabilities face difficulties in access to transportation services. Lack of reliable and accessible transportation is a frequent explanation for the inability of people with disabilities to get to and from jobs, medical appointments, or myriad other important activities in the community. Lack of transportation also creates barriers to civic participation such as voting or attending public meetings.[57] The resulting social isolation is an important cause of mental health issues, particularly depression, among people with disabilities.[58] Access to transportation may become even more problematic if, as some predict, transit officials become reluctant to invest in public transit out of concern that it soon will be supplanted by automated vehicles.[59]

53. 42 U.S.C. § 12132 (1990).

54. *Id.* at § 12131(1).

55. *Id.* at § 12131(2).

56. *Id.*

57. HENRY CLAYPOOL ET AL., *supra* note 2, at 21 (estimating that up to three million people may have been unable to vote in 2012 because of the lack of accessible transportation).

58. *Id.* at 20–21.

59. *See, e.g.*, NATIONAL COUNCIL ON DISABILITY, *supra* note 18, at 6; Lee Davidson, *Will Self-Driving Cars, Taxis Make Mass Transit Obsolete?*, SALT LAKE TRIB. (Aug. 16, 2017),

A. Driver's Licenses

The rules for acquiring driver's licenses are set by state law. The National Council on Disability ("NCD") has proposed that once fully automated cars are available, "there is no reason for an occupant to be licensed at all."[60] This is an extreme claim, surely false for any cars that are less than fully automated and perhaps even problematic for cars that are fully automated. Even with fully automated cars, there may be reason to license to ensure that users are able to act responsibly with respect to questions such as who may be passengers in the vehicle, where the vehicle may be instructed to drive, or what route the vehicle might be instructed to take. The NCD has also pointed out that varying state regulations about licensure may be problematic when vehicles cross state lines, although states today do enforce different requirements based on the age of drivers.[61]

Driver's licenses, including commercial licenses, are public services for ADA purposes[62] Public entities must administer the testing process and make licensing decisions in a manner that does not discriminate. It is disability discrimination to fail to make reasonable modifications for people with disabilities during the testing process.[63] In a number of cases, however, license applicants with disabilities have confronted requirements that were not imposed on non-disabled applicants; courts have upheld these requirements based on what were characterized as legitimate interests in public safety. For example, when Stafford Coolbaugh and his wife moved from California to Louisiana, she was issued a Louisiana driver's license based on her California license but he was not. Louisiana insisted he provide medical certification and take a road test in his own hand-controlled vehicle because they observed that he was paraplegic. The court held that Louisiana had acted reasonably to protect the public safety.[64]

On the other hand, it would clearly be discriminatory for a licensing agency to refuse to grant someone a license because they drive a vehicle in a non-

http://www.sltrib.com/news/politics/2017/08/16/will-self-driving-cars-taxis-make-mass-transit-obsolete/.

60. NATIONAL COUNCIL ON DISABILITY, *supra* note 18, at 6–7.

61. In New Jersey, the minimum age for an unrestricted license is eighteen; young drivers who move to New Jersey after being licensed elsewhere must still comply with the New Jersey requirements and cannot transfer their licenses. STATE OF NEW JERSEY, MOTOR VEHICLE COMMISSION, GDL DEFINITIONS, http://www.state.nj.us/mvc/Licenses/gdl_definitions.htm (last updated Mar. 13, 2017). Many states have enacted graduated driver's license statutes; requirements vary and teens are expected to comply with the requirements of their state of licensure when they drive out of state.

62. Briggs v. Walker, 88 F.Supp.2d 1196 (D. Kan 2000).

63. Dunn v. La. Dep't of Pub. Safety & Corr., 2014 WL 1431469 (M.D. La. 2014) (not reported in F. Supp.3d) (describing discrimination to require spoken English rather than written English in a skills test for a CDL)

64. Coolbaugh v. La. Dep't of Pub. Safety & Corr., 136 F.2d 430 (5th Cir. 1998). Coolbaugh had used his California license for identification purposes only and did not have a hand-controlled vehicle in which to take the test. *See also* Theriault v. Flynn, 162 F.3d 46 (1st Cir. 1998).

standard way. For example, it would be discrimination to refuse to grant a license to someone who used hand controls or elevated foot pedals to operate a vehicle both of which are reasonable modifications under the ADA regulations.[65] In its brochure about adapting motor vehicles for people with disabilities, the National Highway Traffic Safety Administration lists the following features as possible ways to improve the comfort and safety of drivers with disabilities: high or wide doors, adjustable foot pedals, large interior door handles, oversized knobs with visible labels, support handles, large or adjustable size print for dashboard gauges, seat adjusters, and dashboard-mounted ignition.[66] Notably, none of these adaptations include automated driving features.

Whether automated driving features are different in kind from other vehicle adaptations is potentially an open question, however. A variety of features that enable drivers who lack mobility to exercise control of vehicles are under design, including high-tech joysticks or voice activated controls.[67] This equipment functions under real-time control of the driver who is expected to react to road conditions and give appropriate commands to the vehicle. An alternative would be a vehicle that is programmed to react to road conditions in a manner that is automated. The vehicle might even be designed with override capabilities that could allow the driver to respond in real time—for example, by voice or by sip and puff activation. Suppose that one or more of these types of vehicle design are significantly safer, not only for people with disabilities but for everyone else who uses the vehicle as a driver.[68] Analytically, it would seem that to fail to license a user of such a vehicle because the user has a disability would be disability discrimination, just as it is disability discrimination to fail to license a driver who drives a vehicle in a non-standard way that is readily available today. Instead, non-discrimination would require licensing the driver with conditions: to operate an automated vehicle that meets safety requirements appropriate to the disability in question.

65. C.F.R. § 35.130(b)(6)–(7).

66. NHTSA, ADAPTING MOTOR VEHICLES FOR PEOPLE WITH DISABILITIES 11 (last revised June 2015), https://one.nhtsa.gov/Driving-Safety/Disabled-Drivers/disabled%E2%80%93drivers%E2%80%93and%E2%80%93passengers.

67. *See, e.g.*, National Mobility Equipment Dealer's Association, *Advanced Driving Controls May Put You in the Driver's Seat*, DRIVERS WITH DISABILITIES BLOG (Nov. 4, 2011), https://www.nmeda.com/advanced-driving-controls-may-put-you-in-the-drivers-seat/; *see, e.g.*, DRIVE-MASTER TOTAL MOBILITY CENTER, HITECH DRIVING CONTROLS (2017), http://drivemastermobility.com/products/hi-tech-driving-controls/; *see, e.g.*, Jaise Jose, *Voice Guided Vehicle for Handicapped* 35 INT'L J. COMPUTER APPLICATIONS (2011).

68. For a discussion of these safety questions, see *infra* Part IV.

B. Street Design

Since the Architectural Barriers Act of 1968, federally funded facilities must meet accessibility standards.[69] This Act brought curb cuts into widespread use—one of the most universally lauded and beneficial achievements of the disability rights movement. Since 1990, the ADA has required public entities to meet access standards; these include at a minimum compliance with the Architectural and Transportation Barriers Compliance Board design standards.[70] Most of the attention to accessibility has concerned buildings and pedestrian rights of way, as these are the facilities that it is assumed will be used by people with disabilities. But there is no reason why streets should not come under the same strictures.

Construction standards differ for alterations and for new construction. Modifications of roads are alterations, which must meet the "maximum extent feasible" standard.[71] Roads are modified over time, as new safety features, pavements, bicycle lanes, or pedestrian-traffic interfaces are constructed. If automated vehicles become increasingly available and usable by people with disabilities, it may be relevant to consider whether accessibility requirements should include features to facilitate their use. Examples might include turnouts or shoulders to allow automated vehicles to pull off the road and stop safely for users who are at risk of losing capacity as with a seizure. They might include signals that are programmed to communicate road information to automated vehicles and that are part of a system of automated vehicle management. Features of the existing roadway, such as width, grade, mature trees, or utility installations, may limit the feasibility of these changes.[72] But there are many examples of streets that have been modified to allow new features such as dedicated bus or bicycle lanes that are at least as structurally significant as turnouts might be.

Modifications in public programs are unreasonable to the extent that they involve fundamental alterations in program design. It is fair to expect that public entities faced with expensive design requirements for automated vehicles might contend that these are fundamental alterations of providing and maintaining public streets for driving. Driving, it could be said, requires user-operation, so it is a fundamental alteration of streets to construct them for use of automated

69. 42 U.S.C. §§4151 (1968).

70. 42 U.S.C. § 12134(c) (1990).

71. UNITED STATES ACCESS BOARD, PLANNING AND DESIGNING FOR ALTERATIONS, at ch.1 (2007), https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/guidance-and-research/accessible-public-rights-of-way-planning-and-design-for-alterations/chapter-1%E2%80%94introduction.

72. *Id.* at ch. 2, https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/guidance-and-research/accessible-public-rights-of-way-planning-and-design-for-alterations/chapter-2%E2%80%94alterations.

vehicles. This objection will gradually lose force, however, if driving itself increasingly becomes automated. When automated driving is commonplace—which some predict may not be very far off—it will be untenable to contend that use of automated vehicles by people with disabilities is a fundamental alteration. Adjusting streets for automated driving may become like adjusting sidewalks for curb cuts: a set of changes implemented for disability access that are widely regarded as beneficial to all.

Another area of concern about the use of automated vehicles generally, as well as by people with disabilities, is tort liability. In theory, governmental entities might be subject to tort liability for issuing licenses or designing facilities that are unsafe. Governments can use sovereign immunity to protect themselves in whole or in part from tort liability. Even if governments do not choose to rely on immunity, they may also have an important role to play in assuring the safety of automated vehicle systems. I now turn to these problems of tort liability, focusing on how they are raised when automated vehicles are used by persons with disabilities.

IV. TORT LAW: DANGERS FROM AND DANGERS OF MOBILITY ASSISTANCE

As a general matter, persons with disabilities have not fared well in tort law, particularly when they have been injured by others and are considered to have been contributorily negligent for not having exercised extra caution to protect themselves. This section considers how persons with disabilities might—and should—fare as users of automated vehicles involved in accidents.

A. Disability Discrimination in Tort Law

In his pathbreaking law review article, "The Right to Live in the World: The Disabled in the Law of Torts," Jacobus tenBroek[73] detailed how tort law fails to protect people with disabilities from dangers constructed by others. If a construction firm leaves an open hole, with no warning or barrier, and a visually impaired person is injured by falling in, tenBroek argued, a damages remedy should lie against the construction company.[74] The failure to do so cuts squarely against policies of integrationism apparent in the Rehabilitation Act[75] and other efforts to bring people with disabilities into the work force. tenBroek wrote: "If the disabled have the right to live in the world, they must have the right to make

73. Jacobus tenBroek, *The Right to Live in the World: The Disabled in the Law of Torts*, 54 CAL. L. REV. 841 (1966).

74. *Id.* at 882.

75. In its present form, the Rehabilitation Act of 1973, Pub. L. 93-110, 87 Stat. 355, 29 U.S.C. §§ 701 *et seq.*

their way into it and therefore must be entitled to use the indispensable means of access, and to use them on terms that will make the original right effective."[76] Negligence law protects people from conduct that subjects them to "unreasonable risk of harm," judged both in light of the probability of the harm and its severity.[77] Reasonableness is judged by the behavior of the person of ordinary prudence; but the problem is how prudence is to be defined in light of the circumstances of persons with disability.[78] If all the law does is exempt the person with disabilities from expectations applied to those without disabilities, tenBroek says, it will be a "cruel hoax,"[79] for it will fail to address what requirements may be imposed in light of these reduced expectations. Similarly, it is a mistake to develop standards simply by analogizing the circumstances of people with disabilities to the circumstances of people without disabilities. As an example, tenBroek explains how the case law developed by analogizing blind people to sighted people in the dark; to see how this analogy fails, all that is necessary is to realize that hanging a light will solve the problem for sighted people but will do nothing for the blind.[80] In calculating the reasonableness of risks, tort law must consider how people with disabilities can live in the world on the same terms as others in light of the costs of reasonable preventive measures, tenBroek famously maintained.[81] The right to live in the world, in the words of Martha Minow,[82] "makes all the difference" in this calculation.

B. People with Disabilities as Tortfeasors

tenBroek wrote about how people with disabilities are disfavored when they are the victims of accidents. The question posed by people with disabilities using automated vehicles is the reverse; here, the person with disabilities is in the position of the alleged tortfeasor. Anecdotally, friends of mine with disabilities contend that they are viewed with suspicion when accidents occur, assumed to be at fault even when they were rear-ended while completely and properly stopped at a red light. Very few legal cases, however, have raised or addressed the problem of disability discrimination when persons with disabilities are alleged tortfeasors in accidents.

The few reported decisions suggest that persons with disabilities may be held to a standard of care that requires them to consider their disabilities in how

76. tenBroek, *supra* note 73 at 848.

77. *Id.* at 865.

78. Baltimore & Ohio R. Co. v. Goodman, 275 U.S. 66 (1927).

79. tenBroek, *supra* note 73 at 866.

80. *Id.* at 869.

81. *Id.* at 881.

82. MARTHA MINOW, MAKING ALL THE DIFFERENCE: INCLUSION, EXCLUSION, AND AMERICAN LAW (1991).

they drive. In *Hosmer v. Distler*,[83] for example, a pedestrian was hit and killed by the defendant driver, who wore bifocals and a prosthetic leg. The court held that not only should the driver be held to the standard of a reasonable licensed driver, but he also "had the additional responsibility or exercising caution to compensate" for hazards increased by his disabilities.[84] In *Sanders v. Alger*,[85] a caregiver sued a patient for injuries suffered when he helped the patient stand up in order to get into a car. The Arizona court held that the patient, who was 74 years old and had cerebral palsy, owed his caregiver a special duty of reasonable care, which he had violated by not heeding the caregiver's warnings. The court rejected the lower court's analysis, which had rested on the contention everyone owes a duty of care to everyone else, in favor of the more limited view that patients have special duties to their caregivers with respect to not engaging in conduct creating a risk of physical harm to the caregiver.

There is also a reported case in which Louisiana was held liable for issuing a driver's license without a medical examination or a driving test to a driver who had suffered a stroke and lost some use of his right arm and leg.[86] The driver, O'Connor, was a resident in a nursing home; a receptionist at the home had called the motor vehicle office to alert them to the need to test O'Connor's driving when he renewed his license.[87] There was also evidence that O'Connor's disabilities were visible to the driver's license examiners, as he could not sign the application form with his right hand and he limped noticeably.[88] The court upheld a trial court verdict that the state was negligent in issuing the license and O'Connor was negligent in driving.[89]

Whether these cases are in conflict with tenBroek's justifiable insistence on the right to live in the world is complex. On the one hand, it is reasonable to expect people with disabilities to be held to a standard of care in which their actions do not impose unreasonable risks on others. This is not a higher standard of care; rather, it is a standard of care applied to anyone with knowledge of their own special circumstances and capabilities. People who are temporarily on medication, for example, are expected to be knowledgeable about the effects of their medication on their operation of moving vehicles.[90] Their providers, too,

83. 150 A.D.2d 974, 541 N.Y.S. 2d 650 (3d Dept. 1989).

84. 150 A.D.2d at 975.

85. 394 P.3d 1083 (Ariz. 2017).

86. White v. State, 644 So.2d 684 (La. App. 1st Cir. 1994).

87. *Id.* at 690.

88. *Id.*

89. *Id.* at 696.

90. *See* Carolyn Buppert, *Am I Liable for the Actions of an Impaired Patient?,* MEDSCAPE (Oct. 16, 2103), https://www.medscape.com/viewarticle/812450 (discussing the responsibility of a clinician to a patient when dispensing medications that may cause impairment).

are expected to inform them about the risks of impairment from medication.[91] On the other hand, people who experience sudden medical emergencies that they could not have anticipated are not negligent.[92] If people with disabilities are instead, held to a higher standard of care because of their disabilities, this would be problematic on the grounds tenBroek alleged. An example would be holding people with disabilities strictly liable for injuries they cause as drivers. Another example would be holding people with disabilities to a higher safety standard than we hold people without disabilities. Instead, the question should be whether someone acted reasonably under the circumstances, *including* the circumstance of disability.

C. Tort Law, Automated Vehicles, and Disabilities

Tort scholars have expressed concern over how existing negligence standards can clearly apply to automated vehicles in a manner that does not unreasonably deter their development and adoption. In a comprehensive account of how existing tort standards may be applied to these vehicles, Mark Geistfeld puts forward a number of considerations that could be relevant to the analysis of whether a person with disabilities acts reasonably as a user of an automated vehicle, although he does not consider people with disabilities as users. These considerations all form part of his account of how tort principles can give answers to questions about automated vehicles that reduce the uncertainty for manufacturers about liability exposure associated with their introduction.

Geistfeld's initial analytic point is that automated vehicles feature two fundamentally different types of technology: types that rely on human drivers as backups with the associated behavioral factors that this will introduce, and types that are fully automated without any driver intervention at all.[93] Vehicles of the former type function by assisting the driver; they do not, Geistfeld says, "fundamentally alter the roles of the driver and vehicle in executing" the driving task.[94] For these vehicles, drivers will quite literally remain in the liability driver's seat. However, automation is a matter of degree; as it advances in levels to the point at which there is only human intervention when specified circumstances arise, it will create novel questions of safety associated with drivers. The greatest concern is driver reliance on the automated systems; drivers

91. Davis v. South Nassau Communities Hosp., 26 N.Y. 3d 563 (N.Y.App. 2015) (hospital had duty to warn patient about side effects of medication that could impair a patient's ability to drive safety); Coombes v. Florio, 877 N.E.2d 567 (Mass. 2007) (physician owes a duty of reasonable care to everyone foreseeably put at risk by his failure to warn of the side effects of his treatment of a patient).

92. *See, e.g.*, Hagenow v. Schmidt, 842 N.W.2d 661 (Iowa 2014), *overruled on other grounds*, Alcala v. Marriott International, Inc., 880 N.W.2d 699 (Iowa 2016).

93. Geistfeld, *supra* note 6, at 14.

94. *Id.* at 17 (quoting *Key Considerations in the Development of Driving Automation Systems*, CAMP AVR CONSORTIUM, (Sept. 2013), http://www-esv.nhtsa.dot.gov/Proceedings/24/files/24ESV-000451.PDF).

may cease to pay attention at all, texting or watching movies, or even sleeping as their cars roll along. One standard response about product safety is that products must come with warnings (such as "do not watch movies or sleep when using this vehicle as your attention may be required at any time"). If it can reasonably be anticipated, as it surely can, that drivers will regularly ignore these warnings, manufacturers may still be liable for defective product design.[95]

As an alternative to warnings, some manufacturers are exploring ways of addressing such driver inattention with fault-tolerant planning mechanisms to ensure that the driver will be alerted of the need to take over the vehicle when necessary.[96] There is no reason why manufacturers could not explore similar mechanisms for drivers whose disabilities may render them incapable of taking over their vehicles in the same kinds of circumstances. Examples would be vehicles with sensors to detect dangerously low blood sugar in their diabetic users, drowsiness in their users with narcolepsy or sleep apnea, or incipient seizures in their users with epilepsy, and then to pull off the road at the next available turnoff. These vehicles could be designed to be limited to travel on specified routes, such as those in which turnoffs are readily available; or, they could come with warnings to their users about what routes are suitable for use. Geistfeld describes General Motors' plans to develop an operating system to detect drowsiness, warn the driver, and activate a pull over function when the warning is not heeded.[97] If they are similarly likely to fall asleep and similarly difficult to rouse, there should be no difference between the operation of such a system for a person falling into a deep slumber from narcolepsy and a person falling into the same slumber from a night spent working the graveyard shift. If the pull off function is sufficiently safe for the latter, it should be sufficiently safe for the former, too. Even if there are differences in risks between these types of drowsy drivers, it might still be the case that the riskier drowsy driver with the automated system is far safer than conventional drivers today. Or, it might be possible to adjust features of the warning system or routes driven to account for the differential driver risks—much as some drivers today receive limited licenses while others do not. These possibilities will press questions about what comparisons are appropriate in determining user or manufacturer liability. In addition, in Section III above I suggested that these possibilities may also have implications for road designs such as the ready availability of turnoffs. [98]

95. *Id.* at 20.

96. *Id.*; *see generally also* Toshiyuki Inagaki & Makoto Itoh, *Human's Overtrust in and Overreliance on Advanced Driver Assistance Systems: A Theoretical Framework,* INT'L. J. VEHICULAR TECH. (Mar. 24, 2013) (for a discussion on "a theoretical framework to describe, analyze, and evaluate the driver's overtrust in and overreliance on ADAS.").

97. Geistfeld, *supra* note 6, 20–21.

98. *Supra* Part III.

In theory, safety questions about fully automated vehicles would appear to be the same for all users whatever their personal characteristics. At the time when these vehicles appear, therefore, it would seem to follow that no special questions would arise about people with disabilities as users of them. In practice, it might be difficult to eliminate all user choice, however; even these vehicles will need to select destinations and routes, decide who will be passengers, or make choices about how the vehicle is to be programmed.[99] These are tasks that many people with disabilities can perform in a manner comparable to everyone else—surely many more people with disabilities than those who are able to drive today.

Indeed, for fully automated vehicles the primary liability is likely to rest with the manufacturer.[100] Geistfeld suggests that manufacturer liability for such vehicles should be handled by premarket testing; he postulates that when adequate premarket testing has demonstrated a crash risk half that for conventional vehicles, these vehicles could be deemed sufficiently safe for marketing.[101] Whether this or some higher comparative standard is considered sufficient to meet the manufacturer's tort obligations, the standard adopted presses questions of whether people with disabilities as users of automated vehicles should be judged to have met their tort obligations when they meet the same comparative standard. That is, if people with disabilities as users of incompletely automated vehicles are as safe as fully automated vehicles in comparison to conventional vehicles, it would violate their right to live in the world if they are held to a still higher standard.

D. Privacy

The mechanisms by which automated vehicles function raise many privacy questions. To the extent that these vehicles either collect or transmit data in electronic form, they are subject to the security risks of any electronic data set. They will need to be designed to meet appropriate administrative, physical, and technical security standards.[102] Some of the information transmitted to and from these vehicles will be non-sensitive and publicly available, such as information about traffic patterns and the location of safe turnout spaces. Other information may raise complex privacy questions, both for users of automated vehicles and for others they encounter along the way. This section considers three privacy questions that may be especially important to consider for these vehicles when

99. Geistfeld, *supra* note 6, at 24.

100. *Id.* at 22.

101. *Id.* at 47.

102. *See* DEP'T OF COMMERCE, SECURITY AND PRIVACY CONTROLS FOR FEDERAL INFORMATION SYSTEMS AND ORGANIZATIONS, NIST Spec. Pub. 800-53 (2013), http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-53r4.pdf (for a comprehensive discussion of security standards.)

they are used by people with disabilities: the possibility that user medical information may need to be available for vehicle safety, the collection of locational data about the vehicle and its user, and the collection of data by manufacturers to improve vehicle performance.

The communications in which these vehicles are likely to engage make these privacy issues especially difficult. Consider the range of likely communication channels: between user and automated vehicle, between automated vehicle and other vehicles on the road, between automated vehicle and information sources such as accident reports or reports of traffic conditions, and between the vehicle and the manufacturer. Communication with the user will be needed whenever there are override possibilities or whenever the automated vehicle supplements rather than supplanting driver functions altogether. Communication with other vehicles will aid road coordination. And communication with the manufacturer will be needed for ongoing machine learning and feedback to optimize software design—but could also be used to permit the manufacturer (which might be liable in tort) to exercise some control over vehicle operation including approval of users. The privacy issues raised by surveillance technologies are by now well-trodden territory; this section sketches briefly whether the availability of information about people with disabilities from automated vehicles poses novel questions.

First, medical information, including information about disability status, may be needed both for safety in vehicle design and for safety in vehicle operation.[103] If an automated vehicle is being programmed for a particular user with a disability, the information needed may include the nature of the individual's disability and its likely manifestations. As the vehicle is operated, the frequency and severity of the user's symptoms may also become apparent. Consider, for example, an individual with a seizure disorder who is permitted to drive a vehicle that adjusts for the occurrence of a seizure. Design of this vehicle will need to know that the individual has a seizure disorder. It may also need to know about the frequency of onset of seizures and whether there is any advance warning of them in order to program safe routes. As the vehicle is operated, it will also collect information about seizure occurrence in real time.

Sharing this information may benefit the user, as it may allow vehicle design that is tailored to the individual's condition. It may also demonstrate that the individual has been able to drive for considerable periods of time without incident. On the other hand, it may reveal that the individual's condition is more problematic than originally assumed.

103. NATIONAL COUNCIL ON DISABILITY, *supra* note 18, at 1–2 (noting information about disability and health status is a privacy concern for automated vehicles. The Report is particularly concerned about the availability of this information to insurers and to marketers.) But, as this Section indicates the privacy concerns are far more extensive.

Under the ADA, employers are entitled to seek medical information to determine reasonable accommodations or to make a fitness for duty evaluation.[104] To seek a fitness for duty evaluation, the employer must have objective reason to believe that the employee's job performance may be impaired or that the employee may present a threat to himself or others.[105] Information may come from observations of the employee on the job or from third parties.[106] Medical information must be limited to the information needed to determine whether the employee can safely perform the job in question.[107] It must be maintained confidentially according to ADA standards.[108] If employers have both the employee's electronic health record and the employee's employment records, accessing the health record is accessing the employee's medical information and requires appropriate consent from the employee.[109] Whether records from an automated vehicle are medical records, how they must be maintained, when they may be accessed, and whether they may be used on an ongoing basis by the employer to monitor the employee's job performance are surely questions that will arise if employees use automation on the job. At issue in answering these questions will be whether collecting this information should be considered as ordinary job surveillance, applied to all employees, with whatever privacy protections are (or are not) applicable to this surveillance,[110] or whether any special requirements are being imposed on people with disabilities.

Under Title II of the ADA, driver's license authorities are permitted to require applicants to produce medical evaluations when there are concerns about the ability to drive safely. These evaluations may be requested when someone applies for a license, when they renew a license, or if there are conditions on the license.[111] For example, Oregon requires licensed drivers with seizure disorders to report information needed to establish eligibility for licensure at reasonable intervals, as determined at the discretion of the state medical officer.[112] These state laws violate the ADA if they request more information than is needed to determine driver performance. States licensing drivers who use automated

104. EEOC (2000), https://www.eeoc.gov/policy/docs/guidance-inquiries.html#9 [hereinafter EEOC, Enforcement Guidance].

105. 42 U.S.C. § 12112(d) (2008); 29 C.F.R. §§ 1630.13; Enforcement Guidance: Disability-Related Inquiries and Medical Examinations of Employees Under the Americans with Disabilities Act (ADA), 1630.14; EEOC, Enforcement Guidance, *supra* note 104.

106. EEOC, Enforcement Guidance, *supra* note 104.

107. *Id.*

108. 42 U.S.C. § 12112(d)(3)(B),(C) (2008).

109. EEOC, Enforcement Guidance, *supra* note 104; Informal discussion letter: ADA & GINA: Confidentiality Requirements. https://www.eeoc.gov/eeoc/foia/letters/2011/ada_gina_confidentrequre.html.

110. *See* Ifeoma Ajunwa et al., *Limitless Worker Surveillance*, 105 CAL. L. REV. 735 (2017)(discussing a comprehensive discussion of the problematic nature of employer surveillance today).

111. EPILEPSY FOUNDATION, *supra* note 13.

112. OR. REV. STAT. § 807.090 (3).

functions may seek data from the vehicle about user performance; to avoid violating the ADA, the information sought must be limited to that needed to determine driver safety.

Vehicle location and performance information may also be needed in a real-time basis to coordinate the safety of networks of automated vehicles.[113] How this information may be shared and how long it may be kept will pose difficult privacy questions. Some of the information will enable individuals to be tracked across locations, just as the variety of global positioning system data available today permits. Many discussions in the literature treat the legal problems that attend the collection and utilization of this locational information and other similar information gathered by surveillance cameras.[114] Locational information about autonomous vehicles will, however, add the additional concern that there may be incentives to keep it for considerable periods of time in the possibility that it might later be needed to establish liability in the case of an accident.

Finally, manufacturers who seek to continually update software in light of how automated vehicles function may seek information from these vehicles. They may also seek information to assure that vehicles comply with safety warnings to avoid products liability litigation—for example, that cars that are programmed to fit particular driver conditions such as sleep apnea or seizure disorders are operated in accord with these conditions.[115]

CONCLUSION

Automated vehicles present tremendous possibilities for people with disabilities. They also have the potential to open new legal challenges for anti-discrimination law, tort liability, and privacy considerations. The initial discussions of these vehicles have pointed out their potential significance for people with disabilities, while largely ignoring what they might mean for disability law. This Article sets out first steps on the inviting road ahead for people with disabilities as users of automated means of transport.

113. Geistfeld, *supra* note 6, at 41–42.

114. *See, e.g.*, Janine S. Hiller & Jordan M. Blanke, *Smart Cities, Big Data, and the Resilience of Privacy*, 68 HASTINGS L. J. 309 (2017); Danielle Keats Citron & Frank Pasquale, *The Scored Society: Due Process for Automated Predictions*, 89 WASH. L. REV. 1 (2015); A. Michael Froomkin, *Regulating Mass Surveillance as Privacy Pollution: Learning from Environmental Impact Statements*, 2015 U. ILL. L. REV. 1713 (Nov. 3, 2015); Scott Skinner-Thompson, *Performative Privacy*, 50 U.C. DAVIS L. REV. 1673–1739 (2017).

115. *See supra* Part IV.